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| 10/511,785 | 07/25/2005 | Linda Lefevre | Serie 6048 | 4802 |
| Linda K Russell Air Liquide Intellectual Property Department Suite 1800 2700 Post Oak Boulevard Houston, TX 77056 | | | EXAMINER YANG, JIE | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary**Application No.**

10/511,785

Applicant(s)

LEFEVRE ET AL.

Examiner

JIE YANG

Art Unit

1733

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 September 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 20-22, 24-28 and 30-34 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 20-22, 24-28 and 30-34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB06)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claims 1-19, 23, and 29 have been cancelled, claims 30 and 31 are amended, claims 33-34 are added as new claims, and claims 20-22, 24-28, and 30-34 are pending in application, wherein claims 30, 31, and 33 are independent claims.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 21, 22, 24-27, and 30-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stratton et al (WO 02/44430, the corresponding US patent is US 7,147,732 B2, thereafter US'732) in view of Wandke (EP 0869189 machine translation, thereafter EP'189).

US'732 in view of EP'189 is applied to claims 21, 22, 24-27, and 30-32 for the same reason as stated in the previous office action marked 6/30/2010.

Regarding the newly amended feature of contacting the metal parts with the pressurized cooling gas mixture at a pressure of 4-20 bars in the instant claims 30 and 31, US'732 teaches that the resulting cooled gas stream is compressed to a pressure of 7

bar g (8 bar absolute) in a compressor (Col.4, lines 7-8 of US'732), which is within the range of 4 to 20 bars as recited in the instant claims.

Regarding adding an additive gas in the instant claim 30, US'732 teaches including hydrogen in the mixture gas (Abstract and Col.2, lines 16-27 of US'732), which reads on the limitation of adding additive gas selected from hydrogen, helium, or mixtures thereof as recited in the instant claim. The other amendment in claim 30 does not change the scope of the claim.

Regarding the newly added claims 33 and 34, US'732 teaches a quenching metallic object method using a compressed mixing gas (Abstract of US'732), which reads on forming the pressurized gas mixture for cooling a metal part as recited in the instant claim. US'732 teaches that the mixture of gas includes carbon monoxide or carbon dioxide (Col.2, lines 16-27 of US'732), which reads on the limitation of the gas mixture including one or plurality of infrared radiation absorbing gases as recited in steps a) and b) of the instant claim 33. US'732 does not specify adjusting the gas mixture for optimizing the convective heat transfer properties. EP'189 teaches a process for gas quenching metallic workpieces (title of EP'189). EP'189 teaches that the cooling helium, hydrogen, or mixture from helium and hydrogen

mixes with additional up to 30Vol.% inert gas (page 1, Description of EP'189), which reads on the selected gas in the instant claim 34. EP'189 further teaches that beside of applying the usual inert gases, such as nitrogen and argon, the gas with higher power consumption ability, such as carbon dioxide, hydrogen sulphide or water vapor can be applied. And particularly preferred for this carbon dioxide is used (claim 4 and Page 2, 3rd paragraph of EP'189). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the gas with higher power consumption ability instead of nitrogen, such as applying carbon dioxide or water vapor, as disclosed by EP'189 in the process of US'732 in order to obtain a desired cooling result. See MPEP 2144.06. Because US'731 in view of EP'189 teaches adjusting the similar gases (including hydrogen, helium, carbon monoxide or carbon dioxide, and water vapor) within the similar ranges (Col.2, lines 16-27 of US'732) for the same rapid cooling metallic object application (Col.1, lines 7-24 of US'732) as recited in the instant claims, therefore, it would be highly expected in the process of US'732 in view of EP'189 to obtain a gas mixture with an average mixture density being approximately the same as that of nitrogen as claimed. MPEP 2112.01.

Regarding the limitation of convective heat transfer properties in claim 33, which fully depends on the composition of the mixture gas, US'731 in view of EP'189 teaches adjusting the similar gases (including hydrogen, helium, carbon monoxide or carbon dioxide, and water vapor) within the similar ranges (Col.2, lines 16-27 of US'732) for the same rapid cooling metallic object application (Col.1, lines 7-24 of US'732) as recited in the instant claims. The properties, such as convective heat transfer superior to those of nitrogen as recited in the instant claims would be inherently met in the mixture gas of US'732 in view of EP'189. MPEP 2112 III&IV. This position is further evidenced by EP'189. EP'189 teaches that the mixed cooling gas increases the cooling rate by 5-20% (page 1, 4th paragraph of Description of EP'189).

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over US'732 in view of EP'189 and Nakamura (JP 63149313, thereafter JP'313).

US'732 in view of EP'189 and further in view of JP'313 is applied to claim 20 for the same reason as stated in the previous office action marked 6/30/2010.

Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over US'732 in view of EP'189 and Andersson (US 5,938,866, thereafter US'866).

US'732 in view of EP'189 and further in view of US'866 is applied to claim 28 for the same reason as stated in the previous office action marked 6/30/2010.

Response to Arguments

Applicant's arguments, see "applicant arguments/remarks", filed 9/28/2009, with respect to the rejection(s) of claim(s) under 35 U.S.C. 103(a) have been fully considered but they are not persuasive. Regarding the arguments related to the amended feature in the instant claims, the Examiner's position is stated as above.

In the remark, the Applicant argues: US'732 expressly teaches away from highly pressurizing the cooling gas while EP'189 requires the gas be at a pressure of 40 bar or more. Because the cooling gas mixtures of US'732 and EP'189 are designed for different operating conditions, replacing the gas mixture of US'732 with that of EP'189 is not a substitution with an art recognized equivalent. Modifying US'732 to use a separate cooling gas mix pre EP'189 would therefore a) radically alter the principle of operation of US'732 from using the same gas mixture for heat treatment and cooling and b) render US'732 unsuitable for its intended purpose of obviating the need for a separate supply of hydrogen.

In response,

As pointed out in the rejections for the instant claims 30 and 31, US'732 teaches that the resulting cooled gas stream is compressed to a pressure of 7 bar g (8 bar absolute) in a compressor, which is within the range of 4 to 20 bars as recited in the instant claims. Although EP'189 teaches the advantage of using a high pressure gas for the cooling (over 40 bars), but there is no evidence to show the mixture of gas of EP'189 could not be used in a lower pressure condition of US'732. Furthermore, the pressure of a cooling gas mixture is recognized as a result-effective variable in term of cooling effect, which is evidenced by US'732. US'732 teaches that the rate of cooling during quenching is directly related to the velocity of the gas stream, and the velocity to the gas supply pressure (Col.3, lines 11-13 of US'732). US'732 further teaches that the stream of hot gas is preferably compressed to a pressure up to 10 bar gauge (Col.2, lines 28-9 of US'732), which overlaps the claimed pressure range of 4 to 20bar as recited in the instant claims 30 and 31. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the result-effective variable, that is pressure of the gas, in the process of US'732 in view of EP'189 in order to obtain the desired cooling result. Still regarding the Applicant's argument, the Examiner notes that EP'189 further teaches a mixture gas for the cooling process (Abstract of EP'189) and EP'189 clearly teaches that besides usual inert gases (N_2 or Ar), high power consumption gases such as CO_2 , HS, or water vapor can be used for the gas mixture (Claim 4 of EP'189). There is no evidence to support the Applicant's argument that modifying US'732 by using a separate cooling gas mix per EP'189 would therefore radically alters the principle of operation of US'732.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jie Yang whose telephone number is 571-2701884. The examiner can normally be reached on IFP.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on 571-2721244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JY

/ Roy King/
Supervisory Patent Examiner, Art Unit 1733